Tunnels
SAFETY AND TECHNOLOGY ADVANCES IN THE UNITED STATES AND BEYOND
The National Academy of Sciences was established in 1863 by an Act of Congress, signed by President Lincoln, as a private, nongovernmental institution to advise the nation on issues related to science and technology. Members are elected by their peers for outstanding contributions to research. Dr. Marcia McNutt is president.

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The three Academies work together as the National Academies of Sciences, Engineering, and Medicine to provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and inform public policy decisions. The National Academies also encourage education and research, recognize outstanding contributions to knowledge, and increase public understanding in matters of science, engineering, and medicine.

Learn more about the National Academies of Sciences, Engineering, and Medicine at www.nationalacademies.org.

The Transportation Research Board is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to increase the benefits that transportation contributes to society through research and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board’s varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

Learn more about the Transportation Research Board at www.TRB.org.

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* Membership as of May 2020.
Tunnels: Safety and Technology Advances in the United States and Beyond
Steve Ernst and Jeff Western

This TR News theme issue explores tunnels, a crucial—and often underappreciated—link in the transportation network. By opening routes through urban areas and reducing travel time in mountainous regions, tunnels provide access and offer connections that have significant effects on communities and the economy. Examined are the operations, design, safety measures, and technologies for efficient and safe tunnels in the United States and abroad.

Role of Tunnel Organizations

Jacks of All Trades, Masters of Everything: Eisenhower–Johnson Memorial Tunnel Operators
Stephen Harelson

The Eisenhower–Johnson Memorial Tunnel (EJMT) in the remote Colorado mountains faces all the challenges of the average tunnel—and then some. Nearly 15 miles from the nearest town and spending much of the winter under more than 20 feet of snow, EJMT relies on the persistent work of its tunnel operators to ensure the safe movement of vehicles. This article recounts examples of the adaptability, resourcefulness, and resilience of EJMT workers.

National Tunnel Inventory Guidelines and Standards

Tools for Assessing the Cybersecurity of Tunnel Control Centers
Selcuk Nisancioglu and Ingo Kaundinya

Fixed Firefighting Systems in Australia and New Zealand: Results from the FHWA Global Benchmarking Program
Matt Bilson and Steve Ernst

Many tunnel owners and operators are deploying fixed firefighting systems (FFFS) to control fires inside the tunnel more effectively than by emergency ventilation and egress alone, improving the environment for evacuation, rescue, and firefighting. This article addresses an international study of the FHWA Global Benchmarking Program to learn from countries that have successfully deployed FFFS in highway tunnels.

Safety in Highway Tunnel Operations
Gary English

Research, advanced engineering, the involvement of emergency responders, and an emphasis on an integrated safety approach have led to vast improvements in safety in newly commissioned U.S. tunnels. In this article, the author identifies potential safety gaps and improvements to design, operations, and fire life safety systems.

State of the Art in Tunnel Boring Machines
Michael Mooney

Tunnel Fire Life Safety in the United States: Comparing Vintage Under-River Highway Tunnels to Modern Counterparts
Joseph M. Englot

Fixed Firefighting Systems and Self-Evacuation: Influence on User Behavior in Road Tunnels
Ingo Kaundinya and Anne Lehan

This overview of research conducted at Germany’s Federal Highway Research Institute examines the influence of FFFS on human behavior in an emergency evacuation in road tunnels and how these systems interact with existing tunnel safety equipment.

Human Behavior in Tunnels: International Perspective on Educational Strategies
Jürgen Krieger and Ingo Kaundinya

Cover: Fixed firefighting systems and other safety advancements in road tunnels are addressed in this issue of TR News. (Photo: FHWA)
31 Economic Importance of Seattle’s Alaskan Way Highway Tunnel

Bijan Khaleghi

In 2009, earthquake damage led Washington State officials to replace the Alaskan Way Viaduct—then nearly 50 years old—with a bored tunnel. This article tracks the project’s beginnings, process, and future as a key component to the redesign of Seattle’s central waterfront.

33 RESEARCH PAYS OFF

Shedding Light on Tunnels: Proposed Guidelines for Emergency Exit Signs and Marking Systems for Highway Tunnels

Louis J. Ruzzi and Laura Higgins

36 POINT OF VIEW

International Perspective on Fire Safety in Tunnel Design, Operation, and Management

Conrad Stacey

The author examines opportunities for risk control in road tunnel design and operation, with lessons taken from agencies and tunnel owners all over the world—from the United States to Australia and New Zealand to Japan. The article also focuses on details and code compliance that can mask fundamental drivers of risk in tunnels.

TRB COVID-19 Resources

Agencies and organizations can use TRB publications and online resources for useful and timely information to help address issues related to the novel coronavirus pandemic. To read about TRB’s current research and activities and for a list of relevant publications, visit www.nationalacademies.org/trb/blog/transformation-in-the-face-of-communicable-disease.

Coming Next Issue

The July–August 2020 issue of TR News is dedicated to water and the role of transportation agencies in the stewardship of this vital resource, particularly as the ways humans use water is changing dramatically. Authors will explore the evolution of stormwater regulation; how departments of transportation manage water in planning, design, construction, and operations; and more.

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TR NEWS features articles on innovative and timely research and development activities in all modes of transportation. Brief news items of interest to the transportation community are also included, along with profiles of transportation professionals, meeting announcements, summaries of new publications, and news of Transportation Research Board activities.

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